PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : B60N 2/42, F16F 1/12

A1

(11) International Publication Number: WO 99/55553

(43) International Publication Date: 4 November 1999 (04.11.99)

(21) International Application Number: PCT/SE99/00572

(22) International Filing Date: 8 April 1999 (08.04.99)

(30) Priority Data:
9801451-7 24 April 1998 (24.04.98) SE

(71) Applicant *(for all designated States except US)*: EWES STÅLFJÄDER AB [SE/SE]; P.O. Box 45, S-330 10 Bredaryd (SE).

(72) Inventor; and
(75) Inventor/Applicant *(for US only)*: SVENSSON, Kjell [SE/SE]; Tokarp, S-334 91 Anderstorp (SE).

(74) Agent: WALLENGREN, Yngvar; Patentbyrån Y Wallengren AB, P.O. Box 116, S-331 21 Värnamo (SE).

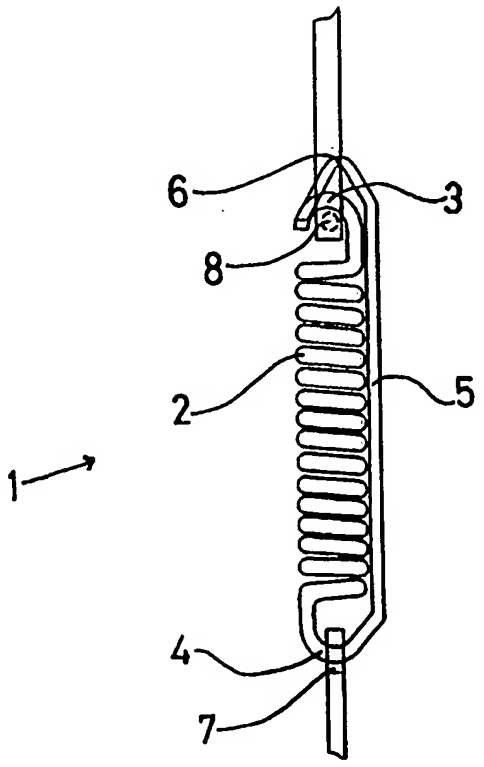
(81) Designated States: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DE (Utility model), DK, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published
With international search report.
In English translation (filed in Swedish).

(54) Title: A BACK REST WITH LIMITED RESILIENCE

(57) Abstract

A back rest for a vehicle seat comprises an outer frame (9) and a inner support member (12) which is located inside the outer frame (9). A number of spring means (1) are provided between the frame (9) and the support member (12), the spring means having limited elongation length. Each one of the spring means (1) has two anchorage members (3, 4) and one limiter device (5) for limiting the elongation length. The limiter device (4) extends approximately between the two anchorage members (3, 4). The limiter device (5) has a free end which is provided with an engagement member (6) which is intended to engage with an arrest member on elongation of the spring (1).



FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania
AM	Armenia
AT	Austria
AU	Australia
AZ	Azerbaijan
BA	Bosnia and Herzegovina
BB	Barbados
BE	Belgium
BF	Burkina Faso
BG	Bulgaria
BJ	Benin
BR	Brazil
BY	Belarus
CA	Canada
CF	Central African Republic
CG	Congo
CH	Switzerland
CI	Côte d'Ivoire
CM	Cameroon
CN	China
CU	Cuba
CZ	Czech Republic
DE	Germany
DK	Denmark
EE	Estonia
ES	Spain
FI	Finland
FR	France
GA	Gabon
GB	United Kingdom
GE	Georgia
GH	Ghana
GN	Guinea
GR	Greece
HU	Hungary
IE	Ireland
IL	Israel
IS	Iceland
IT	Italy
JP	Japan
KE	Kenya
KG	Kyrgyzstan
KP	Democratic People's Republic of Korea
KR	Republic of Korea
KZ	Kazakstan
LC	Saint Lucia
LI	Liechtenstein
LK	Sri Lanka
LR	Liberia
LS	Lesotho
LT	Lithuania
LU	Luxembourg
LV	Latvia
MC	Monaco
MD	Republic of Moldova
MG	Madagascar
MK	The former Yugoslav Republic of Macedonia
ML	Mali
MN	Mongolia
MR	Mauritania
MW	Malawi
MX	Mexico
NE	Niger
NL	Netherlands
NO	Norway
NZ	New Zealand
PL	Poland
PT	Portugal
RO	Romania
RU	Russian Federation
SD	Sudan
SE	Sweden
SG	Singapore
SI	Slovenia
SK	Slovakia
SN	Senegal
SZ	Swaziland
TD	Chad
TG	Togo
TJ	Tajikistan
TM	Turkmenistan
TR	Turkey
TT	Trinidad and Tobago
UA	Ukraine
UG	Uganda
US	United States of America
UZ	Uzbekistan
VN	Viet Nam
YU	Yugoslavia
ZW	Zimbabwe

A BACK REST WITH LIMITED RESILIENCE

TECHNICAL FIELD

The present invention relates to a back rest for a vehicle seat, comprising an outer frame and a support member located inside the outer frame, a number of spring means being disposed between the outer frame and the support member.

The present invention further relates to a spring means with limited elongation length, comprising a draw spring with a first and a second anchorage member disposed at opposite ends of the draw spring, and a limiter device for limiting the maximum elongation length of the draw spring.

BACKGROUND ART

Most vehicle seats and back rests therefor are resilient or springing, not least to increase travelling comfort. However, an excessively resilient or springy vehicle seat is not desirable, since this is not perceived as being comfortable, particularly in long-distance travel. Moreover, the disadvantage inherent in excessive resilience or springing is that the occupier of the seat is forced backwards on a collision from the rear, in order than to be catapulted forwards. A conventional spring will probably amplify this effect. As a result, the risk of so-called whiplash injuries increases markedly.

It is previously known in the art to cause a spring to have limited elongation length. This may be realised by, for example, providing the spring with loose hooks of the length which it is intended to be the maximum elongation length of the spring. Another method of achieving the desired spring characteristics is to design the ambient surroundings of the spring in such a manner that the spring may only be drawn out to a limited length, for example by providing the surroundings with some form of blocking mechanism. The disadvantages in providing a draw spring with loose hooks are numerous. The difficulties in mounting in place, as well as extensive stock keeping of different parts results in high costs. Moreover, the risk of

disturbing noise when the spring is in use is great. A solution which entails that the surroundings of the spring are designed so as to limit the elongation length of the spring often entails complicated and costly reconstruction.

A major disadvantage in connection with vehicle seats is that prior art springs of limited elongation length cannot be retrofitted without the components of the vehicle seat needing to be redesigned and reconstructed.

PROBLEM STRUCTURE

The present invention has for its object to realise a vehicle seat which springs more or less normally on low loading, but which becomes rigid when the maximum permitted elongation of the spring has been reached. This object is to be attained without the need of modifying existing seat designs and constructions.

The present invention further has for its object to realise a spring means with limited elongation length, without loose parts, of a size which does not substantially differ from a conventional spring means and with a simple mounting procedure.

SOLUTION

The objects forming the basis of the present invention will be attained if the spring means included in the back rest have limited elongation length.

Regarding the spring means, the object according to the present invention will be attained if such spring means is given the characterizing feature that the limiter device extends from the second anchorage member of the draw spring, or a device fixedly united therewith, in the longitudinal direction of the draw spring to a region in the proximity of a first mounting device with which the first anchorage member of the draw spring cooperates, the limiter device being, in its free end, provided with an engagement member which, on elongation of the spring means, is disposed to engage with an arrest member which is fixed in relation to the first mounting device.

Further advantages will be attained according to the present invention if the subject matter of the present invention is also given one or more of the characterizing features as set forth in appended Claims 2 to 3 and 5 to 11.

BRIEF DESCRIPTION OF THE ACCOMPANYING DRAWINGS

The present invention will now be described in greater detail hereinbelow, with reference to the accompanying Drawings. In the accompanying Drawings:

Fig. 1 is a plan view of a frame for a back rest according to the present invention in which the spring means according to the present invention has been mounted;

Fig. 2 is a plan view of a spring means according to the present invention;

Fig. 3 shows the spring means according to Fig. 2 in the mounted state and partly elongated; and

Fig. 4 is a plan view of an alternative embodiment of the spring means according to the present invention.

DESCRIPTION OF PREFERRED EMBODIMENT

A conventional draw spring is often designed as a helical, loosely or densely coiled spring with an anchorage member at each end. The helical portion of the draw spring will be designated below as the spring body 2. The anchorage members may be of varying appearance, but are often designed as hooks.

A back rest 13 for a vehicle seat is, inter alia, constructed from an outer frame 9, the seat back frame. Inside the outer frame 9, there is disposed a support member 12 which, in the preferred embodiment, consists of a wire lattice which may be secured in an inner frame or be provided with thicker frame portions 11 at least along opposite, vertical edges. This is springingly

connected to the outer frame 9. In the back rest, which is manufactured according to prior art methods, the seat back frame 9 and the wire lattice 12 are interconnected with conventional draw springs.

In the preferred embodiment, these are replaced by a number of spring means 1 with a limited elongation length. As a result of this feature, a person occupying the vehicle seat, in the event of a collision from the rear, is only pressed into the back rest as far as is determined by the limited elongation length of the spring means. The quantity of energy which, at most, can be "charged into" the spring means is hereby reduced, with the result that the forward catapulting action which the back rest can subject the occupier to is also reduced. The risk of whiplash injuries has hereby been correspondingly reduced.

Fig. 1 shows a back rest for a vehicle seat according to the present invention. The spring means 1 are mounted between the outer frame 9 of the seat back and an inner frame 11 of a wire lattice 12. The seat back frame 9 is provided with mounting devices in the form of lugs 10 with anchorage holes 7 (hereafter referred to as the second mounting device 7, 10). The support member 12 has corresponding mounting devices 8 (hereafter referred to as first mounting devices) for the opposite ends of the spring means 1. These mounting devices are located on the frame 11 of the wire lattice 12, but may also constitute the frame 11 proper or vertical side bars to the support member 12. The spring means 1 according to the present invention may be retrofitted to the previously existing construction without difficulty. The spring means require no great amount of space, and do not consist of more components than a conventional draw spring.

Fig. 2 shows a spring means according to the present invention. A draw spring is provided in each end of its spring body 2 with anchorage members 3 and 4. The anchorage member 4 (which will below be referred to as the second anchorage member, while the anchorage member 3 at the opposite end of the spring body will be referred to as the first anchorage member) is united to a limiter device 5 which runs in the longitudinal direction of the draw spring, e.g. substantially parallel with the spring body 2 without being in contact with it. The limiter device may advantageously be of one piece

manufacture with the rest of the spring means. In the opposite end of the limiter device 5 in relation to the anchorage member 4, there is disposed an engagement member 6. The engagement member 6 is disposed in spaced apart relationship to the first anchorage member 3 in the longitudinal direction of the spring means 1. When the draw spring is stretched, the anchorage member 3 and the engagement member 6 will be displaced in relation to one another. The second anchorage member 4 and the engagement member 6 are always located at a substantially constant distance from one another. This distance is the same as the maximum elongation length of the spring means.

The engagement member 6 on the limiter device 5 is placed in order, on elongation of the spring body 2, to come into abutment against an arrest member which is fixed in relation to the first anchorage member, i.e. in relation to the support member 12. Given that the opposite end of the limiter device 5 is fixed in relation to the second anchorage member 4 of the spring means 1, the second anchorage member being in turn fixed in relation to the outer frame 9, it will be readily perceived that no further movement of the support member 12 in relation to the outer frame can take place.

Fig. 3 shows the spring means 1 mounted between the first mounting device 8 and the second mounting device 7. When these points are separated, the spring body 2 will be stretched out until such time as the engagement member 6 engages with the mounting device 8. The maximum elongation length of the spring means has then been reached. In this embodiment, the first mounting device 8 serves the function of an arrest member.

DESCRIPTION OF ALTERNATIVE EMBODIMENTS

An alternative embodiment of the spring means 1 will be realised if the limiter device 5 is disposed to run inside the spring body 2. This embodiment is illustrated in Fig. 4. The function is substantially the same, but this embodiment may be preferable in the event of extreme shortage of space. The anchorage member 4 may, as illustrated in Fig. 4, be designed as a hook in that the production material is folded double in the hook. Another alternative is to design the anchorage member 4 as a lug. The mounting

device which is intended to engage with the anchorage device 4 may, in such instance, need to be designed differently than if the limiter device 5 had lain outside the spring body 2. Since the limiter device 5 cannot be passed through a hole in an anchorage lug, the mounting device 7 may include a hook or lug as described above, in which a slot is provided from the edge of the lug to the hole. The slot may either be straight or curved. Even when the limiter device 5 is disposed inside the spring body 2, these two parts of the spring means should not abut against one another, so as to avoid making any noise. Another method of avoiding noise is provide the limiter device 5 with a surface coating which reduces squeaking.

The anchorage members 3 and 4 and the engagement member 6 may be given different designs depending upon the surroundings in which the spring means 1 is intended to be mounted. In most cases, the design of the anchorage members 3 and 4 corresponds to that in existing draw springs, i.e. they are designed as hooks which may be caught in a corresponding opening or lug. In many cases, the engagement member 6 may also be a hook.

In the embodiment illustrated in Figs. 2 and 3, the arrest member consists of the first mounting device 8, i.e. the same mounting device with which the first anchorage member engages.

As an alternative to the arrest member and the first mounting device being identical, the engagement member 6 may be caused to engage with some other arrest member which is fixed in relation to the mounting device 8. By such means, the maximum elongation length of the spring means may be changed as compared with that described above. A shorter maximum elongation length will, for example, be obtained if the arrest member intended for the engagement member 6 is located beyond the mounting device 8 with which the anchorage member 3 engages.

Further alternative embodiments may be obtained if the length of the limiter device 5 is modified.

Another alternative is to design the engagement member 6 in such a manner that it may engage with the spring body 2 proper in one of its end portions.

Suitably, this is put into effect by engagement with the outermost coil in the helical portion of the spring body. One advantage is that no external mounting device is required for the engagement member 6, and it is thereby possible to save space. In this alternative, the inner end portion of the spring body constitutes the arrest member.

The present invention may be modified without departing from the scope of the appended Claims.

WHAT IS CLAIMED IS:

1. A back rest for a vehicle seat, comprising an outer frame (9) and a support member (12) located inside the outer frame (9), a number of spring means (1) being disposed between the outer frame and the support member, characterized in that said spring means (1) have limited elongation length.

2. The back rest as claimed in Claim 1, characterized in that each one of the spring means (1) included in the back rest (13) comprise a draw spring with a first (3) and a second (4) anchorage member disposed at opposite ends of the draw spring and a limiter device (5) provided with engagement members (6), the length of said limiter device limiting the elongation length of the draws spring (1).

3. The back rest as claimed in Claim 1 or 2, characterized in that the outer frame (9) and the support member (12) are provided with mounting devices (7, 8) with which the anchorage members (3, 4) and limiter device (5) of the draw spring are intended to engage.

4. Spring means with limited elongation length, comprising a draw spring with a first (3) and a second (4) anchorage member disposed at opposite ends of the draw spring, and a limiter device (5) for limiting the maximum elongation length of the draw spring, characterized in that the limiter device (5) extends from the second anchorage member (4) of the draw spring or a member fixedly united therewith in the longitudinal direction of the draw spring, to a region in the proximity of a first mounting device (8) with which the first anchorage member (3) of the draw spring cooperates, said limiter device (5) being provided in its free end with an engagement member (6) which, on elongation of the springs means, is disposed to engage with an arrest member which is fixed in relation to the first mounting device (8).

5. The spring means as claimed in Claim 4, characterized in that the limiter device (5) is of one piece manufacture with the draw spring.

6. The spring means as claimed in Claim 4 or 5, characterized in that the limiter device (5) has a distance to a helical portion (2) included in the draw spring.

7. The spring means as claimed in any of Claims 4 to 6, characterized in that the limiter device (5) is approximately parallel with the longitudinal axis of the draw spring and surrounded by the helical portion (2) of the spring.

8. The spring means as claimed in any of Claims 4 to 6, characterized in that the limiter device (5) is approximately parallel with the longitudinal axis of the draw spring and is located outside the helical portion (2) of the spring.

9. The spring means as claimed in any of Claims 4 to 8, characterized in that the arrest member consists of the first mounting device.

10. The spring means as claimed in any of Claims 4 to 8, characterized in that the arrest member consists of the spring coil of the draw spring located most proximal the first anchorage member (3).

11. The spring means as claimed in any of Claims 4 to 8, characterized in that the arrest member is disposed a distance from the first mounting device and is rigidly connected therewith.

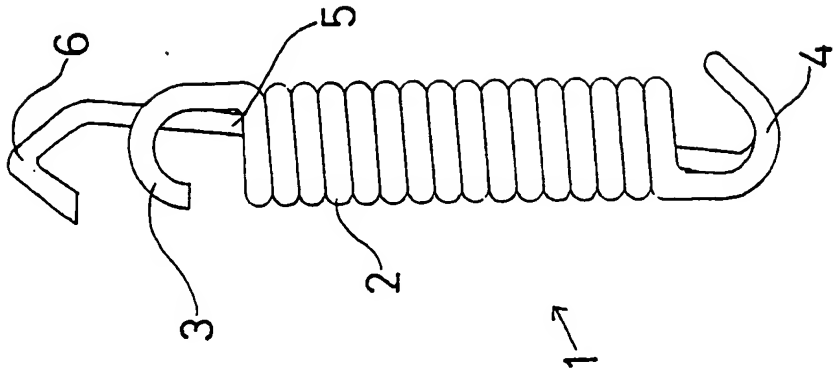


Fig.4

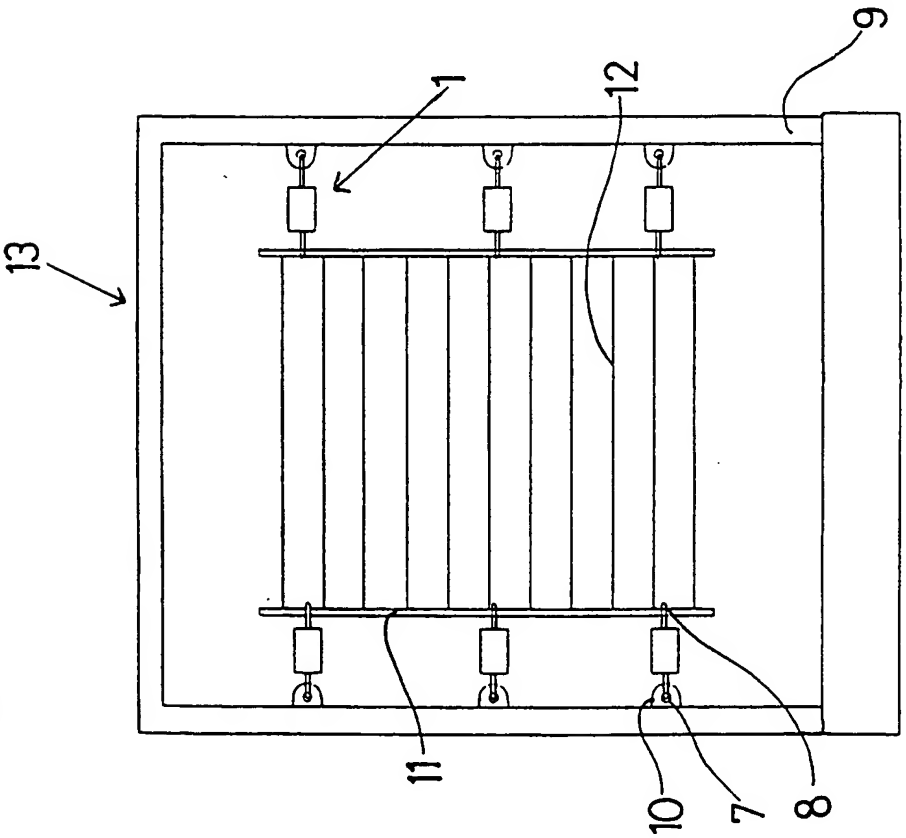


Fig.1

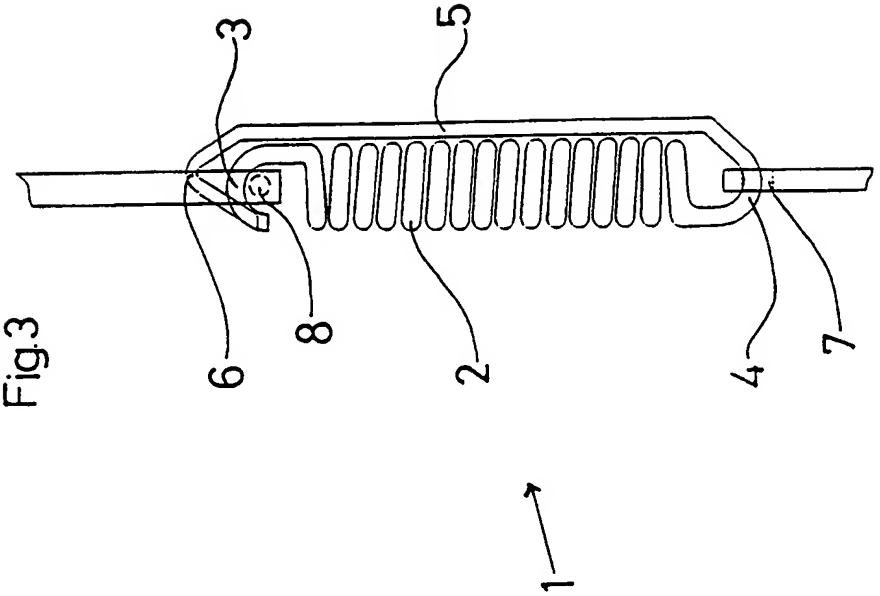


Fig.3

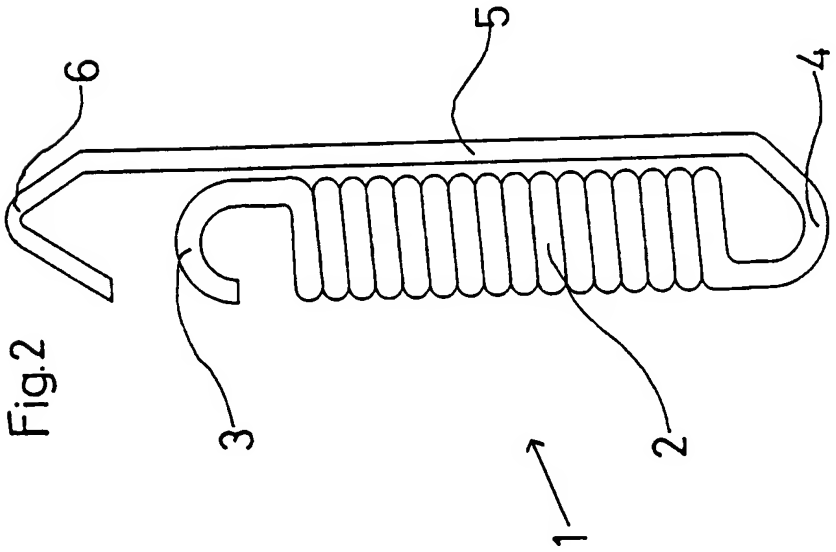


Fig.2